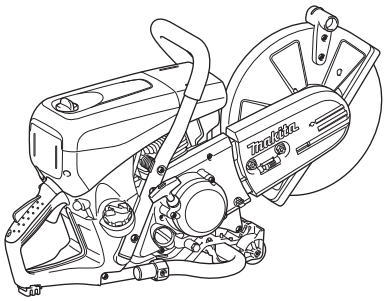
TECHNICAL INFORMATION

Models No. ► EK7650H, EK7651H

Description ► Power Cutters 305mm (12"), 355mm (14")



CONCEPT AND MAIN APPLICATIONS

Models EK7650H and EK7651H are the world's first 4-stroke power cutters.
Their main features are:

- Low fuel consumption, low noise and clean exhaust emission achieved by 4-stroke engine
- Easy start-up with Automatic decompression, Primer pump and On/off choke combination switch with automatic half-throttle lock
- Low-vibration system with damper springs to absorb vibration from engine to integrated front and rear handles.

Each wheel diameter is:
305mm (12") for model EK7650H
355mm (14") for model EK7651H

Dimensions: mm (")		
	EK7650H	**EK7651H**
Length (L)	761 (30)	780 (30-3/4)
Width (W)	310 (12-1/4)	
Height (H)	435 (17-1/8)	455 (17-7/8)

► Specification

Specifications / Model		**EK7650H**	**EK7651H**
Engine	Type	4-stroke	
	Displacement: cm^3 (cu.in)	75.6 (4.6)	
	Fuel	Straight unleaded gasoline*1	
	Max. output: kW	3.0 (at 7,500 $min.^{-1}$)	
	Max. torque: N.m	4.6 (at 5,500 $min.^{-1}$)	
Engine oil		SAE10W-30 oil in the class SF or higher of API Classification	
Fuel consumption: L/h (US oz/h)		1.7 (57.5)	
Fuel tank capacity: L (US oz)		1.1 (37.2)	
Starting system	Rapid start (Spring-assisted recoil starter)	No	
	Decompression valve	Automatic (Mechanical)	
Wheel diameter: mm (")		305 (12)	355 (14)
Max. cutting depth: mm (")		97 (3-13/16)	122 (4-13/16)
Dry weight*2: kg (lbs)		12.7 (28.0)	12.9 (28.4)

***1** Some countries: E10 or E25 gasoline
***2** without cutting wheel

► Standard equipment

Tool kit (Socket wrench 13-16, Hexalobular wrench, Slotted screwdriver and Tool bag)
Oil bottle (containing 220ml engine oil)
Water supply kit
Adapter ring (for some countries only)

Note: The standard equipment for the tool shown above may vary by country.

► Optional accessories

Filter set
Trolley kit
Oil bottle set (10 bottles of 220ml engine oil)
Diamond wheel
Abrasive cut-off wheel

Repair

CAUTION: Repair the machine in accordance with “Instruction manual” or “Safety instructions”.

Warning: Follow the instructions described below in advance before repairing:

- Wear gloves.
- Remove the cutting tool from the unit.
- When the engine is hot from use, cool down the engine enough or you can get burned.
- Remove remaining fuel from Fuel tank and Carburetor completely. **[FLAMMABLE MATERIAL KEEP FIRE AWAY]**
- Remove Spark plug cap from Spark plug.
- Repair the engine on a stable workbench and in a clean workplace kept as free of dust and debris as possible.
- In order to avoid wrong reassembly, draw or write down where and how the parts are assembled, and what are the parts. It is also recommended to have boxes ready to keep disassembled parts by group.
- Handle the disassembled parts carefully. Clean and wash them properly.
- If some bolts and screws are too tight, use Impact driver.
- Tighten the bolts and the screws to the specified torque as shown in "**[5] Tightening torque specifications**".
- Each time after you mounted a main part of the engine such as the piston, check if it moves smoothly without abnormal noise by manually turning the crankshaft.
- After completion of reassembly, check for loose parts or abnormal noise and vibration by manually turning the crankshaft.

[1] NECESSARY REPAIRING TOOLS

Code No.	Description	Use for
1R003	Retaining ring pliers ST-2N for External ring	removing Lock off lever
1R005	Retaining ring pliers RT-2N for Internal ring	removing Cotter
1R030	Bearing setting pipe 25-17.2	press-fitting Ball bearing 6203LLU into Cutting device
1R223	Torque wrench shaft 20-90N·m	assembling Clutch complete to Crankshaft
1R224	Ratchet head 12.7 (for 1R223)	
1R288	Screwdriver magnetizer	removing/ assembling Cotter
1R290	Hexalobular bit VT-27 (6.35mm)	removing/ assembling Hexalobular bolt
1R291	Retaining ring S and R pliers	removing/ installing Retaining ring R-40
1R308	Spring pin extractor 4.0	removing Pin 5 from Rocker arm assembly
1R311	Retaining ring pliers	removing Tubes
1R364	Flywheel puller	removing Flywheel
1R366	Feeler gauge set	adjusting the gap between Ignition coil and Flywheel, Rocker arm assembly and Valve section, Spark plug
1R372	Crank shaft lock bolt M10	holding the position of Piston/ preventing Crankshaft from being rotated
1R389	Cotter removal attachment	removing Exhaust / Intake valve system
---	Socket/ Socket bit 17	removing/ installing Clutch
---	Socket/ Socket bit 24	removing/ installing Clutch
---	Wire brush	cleaning Spark plug
---	Hex wrench 2.5	assembling/ removing / adjusting M5 Hex socket head bolt
---	Wrench 8	holding M5x9 Hex nut

[2] GASKET

Once Gasket is removed:

(1) Clean up the mating surface where the gasket was installed to maintain its sealing performance.

(2) Replace it with a new one.

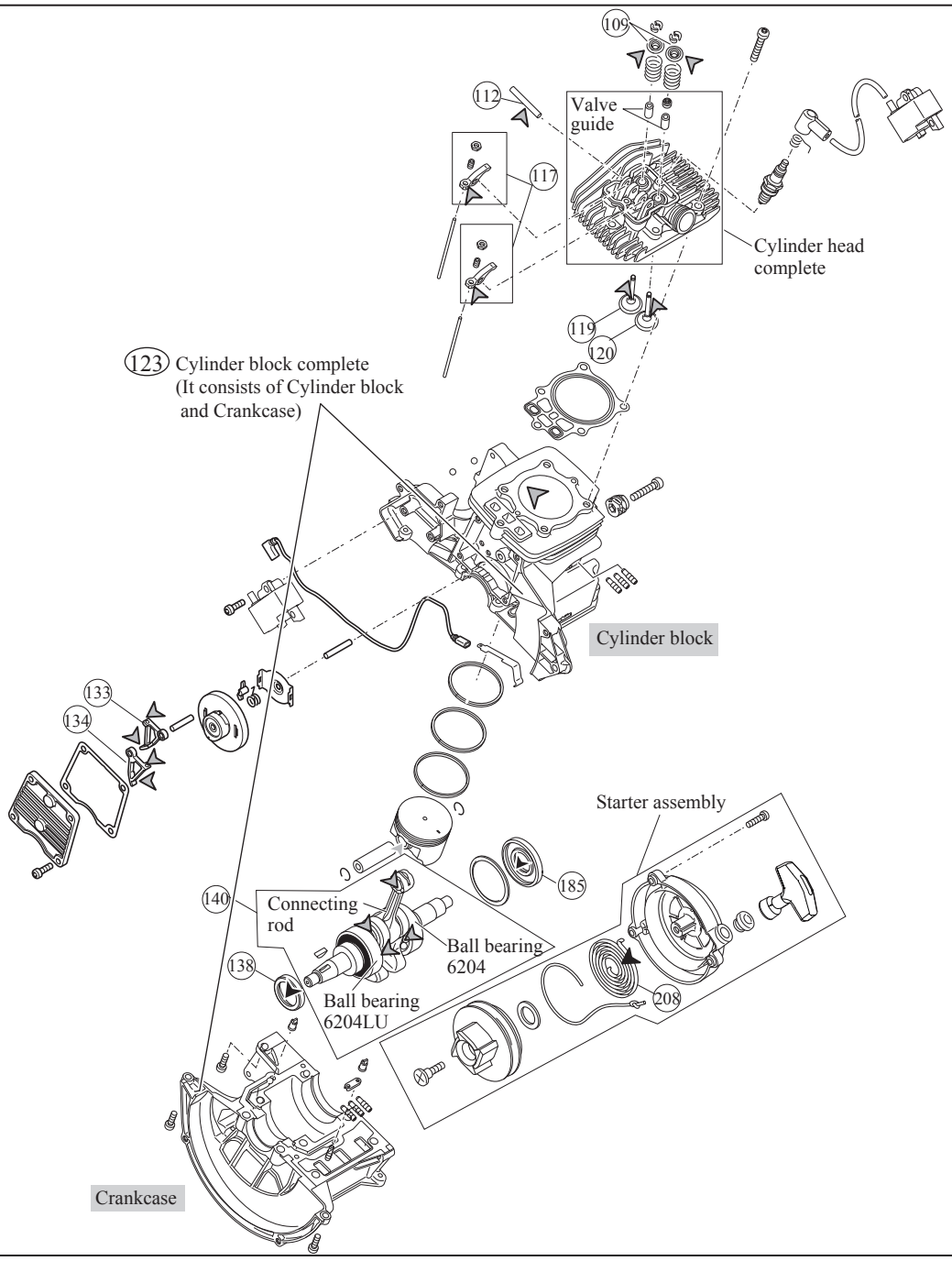
Repair

[3] LUBRICANT/ ADHESIVE APPLICATION

Apply the following grease/ oil to protect parts and product from unusual abrasion.
Note: After assembly, supply 220cc of 4-cycle engine oil from the inlet of machine before trial run.
When disassembling the engine, put ThreeBond 1215 to the matching surface of Crank case and Cylinder block. (**Fig. 66**)

Item No.	Description	Use for	Lubricant	Amount
(109)	Retainer (2 pcs.)	Contact surface with (119) and (120)	4-cycle Engine oil ◁ (API grade SM class)	a little
(112)	Pin 5	Contact surface with the holes of Cylinder head assembly		
(117)	Push rod (2 pcs.)	Contact surface with the holes of Rocker arm assembly		
(119)	Exhaust valve	Contact surface with the inner periphery of Valve guide		
(120)	Intake valve			
(123)	Cylinder block complete	Contact surface with Piston		
(133)	Cam lifter L	• Contact surface with Push rod • Contact surface with Cam gear complete		
(134)	Cam lifter R			
(138)	Oil seal 17	Inner periphery	Makita grease N No. 2 ◀	a little
(140)	Crankshaft complete	• Steel balls in Ball bearings 6204LU and 6204 • Hole of Connection rod to pass Piston pin in Piston • Needle cage in the other hole of Connection rod	4-cycle Engine oil ◁ (API grade SM class)	a little
(185)	Oil seal L	Inner periphery	Makita grease N No. 2 ◀	a little
(208)	Spiral spring	Entire surface		

Fig. 1



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-1. V-belt 5-800, Cutting device

DISASSEMBLING

(1) Loosen two M8 Hex nuts slightly with Wrench 13-16 of a standard accessory. (**Fig. 2**)
(2) Release the tension on V-belt 5-800 by turning M6 Tensioning screw counterclockwise with Screwdriver.
The position of M6 square nut shows the tension level; as it comes close to the minus mark, the belt tension is relieved. (**Fig. 2**)
(3) When Water supply set is on the machine, remove it. (**Fig. 3**)
Holder (**Fig. 2**) can be removed from Belt cover by turning clockwise/ counterclockwise to 90° .
(4) Remove two M8 Hex nuts, then separate Belt cover and Hood section from the machine. (**Fig. 4**)
(5) When Hood section is disassembled:
1. Face the blade installation side of Spindle toward the ram of Arbor press.
2. Press Spindle out of Cutting device. Ball bearing 6203LLU is removed together with Spindle. (**Fig. 5**)
(6) Remove Retaining ring R-40 from Cutting device with 1R291, and then press the other 6203LLU out of Cutting device. (**Fig. 6**)

Fig. 2

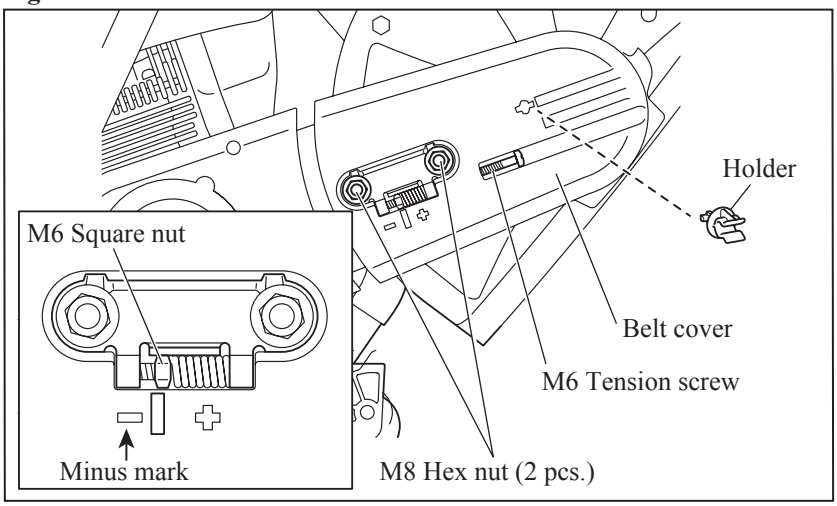


Fig. 3

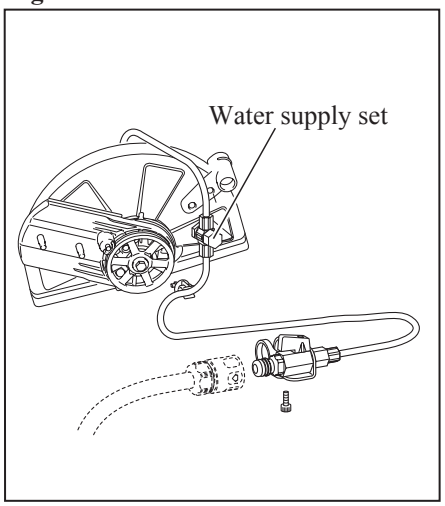


Fig. 4

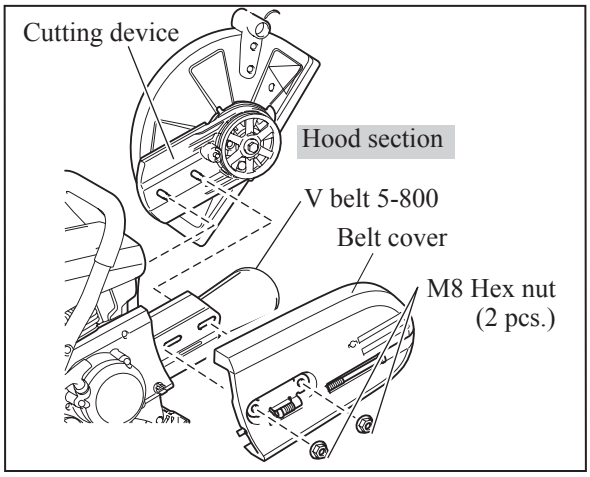


Fig. 5

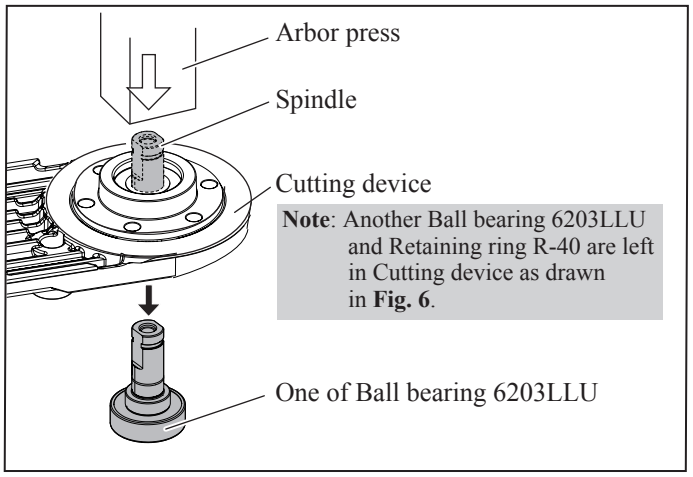
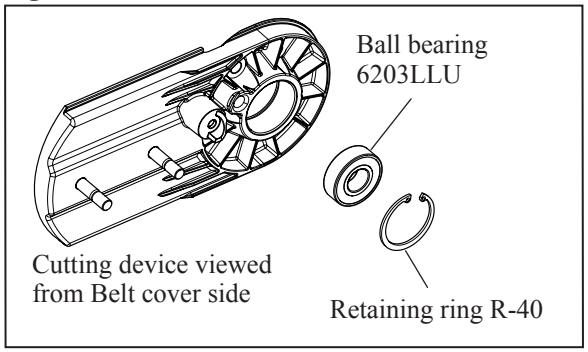


Fig. 6



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-1. V-belt 5-800, Cutting device (cont.)

ASSEMBLING

Assemble their parts by reversing the disassembly procedure.

(1) Assemble one of Ball bearing 6203LLU to Cutting holder, then snap Retaining ring R-40 into the groove of Cutting device to secure the bearing.

(2) Insert Spindle into the other Ball bearing 6203LLU, then assemble them to Cutting device until they stop.

Note: Use two 1R030 as drawn in **Fig. 7** so that their inner retainers of Ball bearings 6203LLU can be held without load to the other portions.
This retains the proper tensions to their inner retainers.

(3) Insert Lock shaft into the place of Cutting device, then set Sliding disc and Impact plate. Push Lock shaft from Belt cover side toward Blade installation side until the top bumps against Impact plate. (**Fig. 8**)

(4) Belt tension must be adjusted by turning M6 Tension screw clockwise until M6 Hex nut is aligned to a line between plus mark and minus mark. (**Fig. 9**.)

(5) Holder of Water supply set can be set to Belt cover by turning clockwise/ counterclockwise to 90° .

Fig. 7

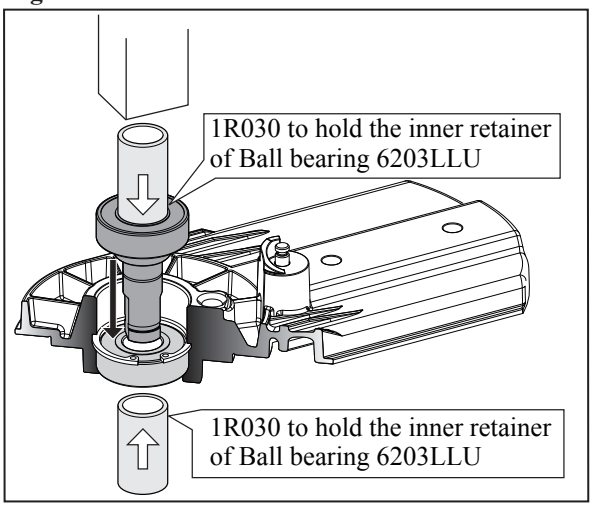


Fig. 8

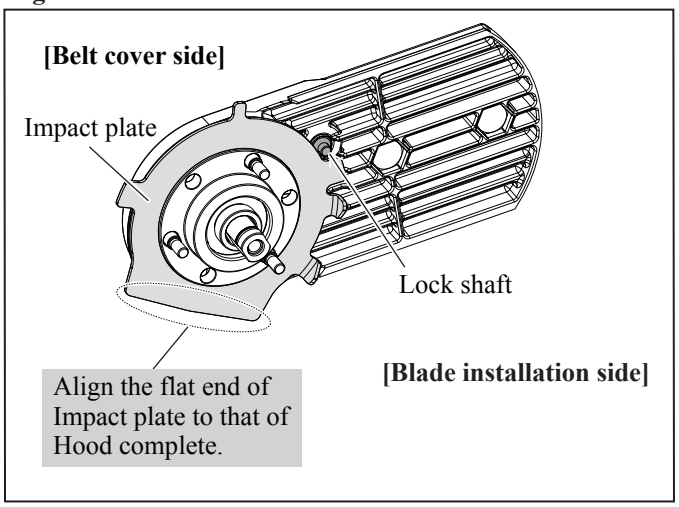
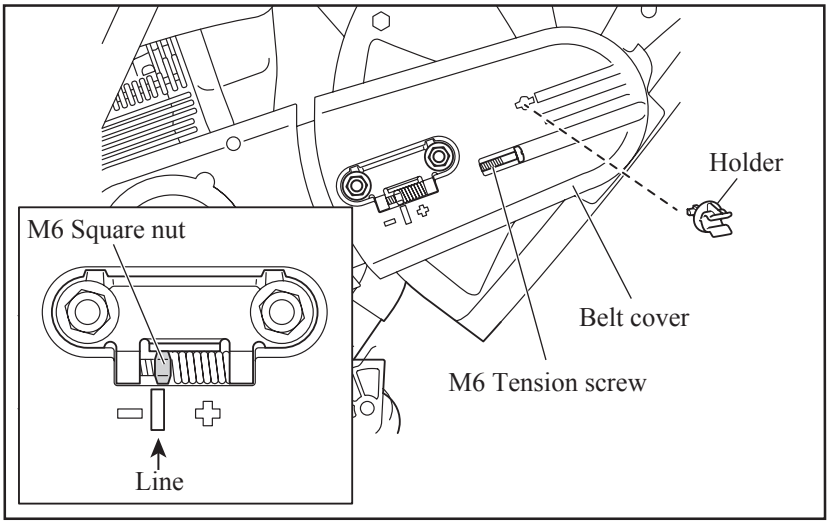


Fig. 9



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-2. Starter assembly

DISASSEMBLING

(1) Loosen three M5x19 - Hexalobular socket head bolts, then remove Starter assembly. (**Fig. 10**)
(2) When Starter rope is not broken;
  1. Make a slack of Starter rope then hook it on U-shaped notch of Reel. (**Fig. 11**)
  2. Be sure to loosen the spiral spring force by turn Reel clockwise to spin Starter rope around Reel before the step (3). (**Fig. 11**)
(3) Loosen M6x20 Set screw with Phillips screwdriver No. 3. (**Fig. 11**)
(4) When Reel is removed from Starter case, insert a index finger carefully to the reverse side of Reel and then remove Reel from Starter case with Spiral spring attached. (**Fig. 12**.)

Fig. 10

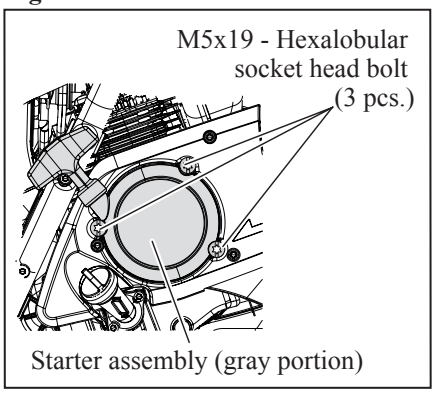


Fig. 11

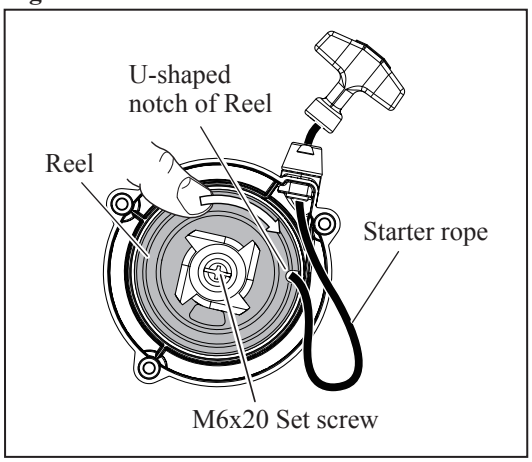
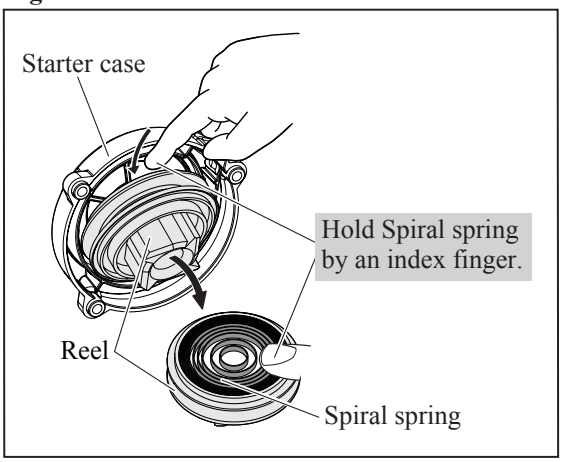


Fig. 12



ASSEMBLING

(1) If Spiral spring pops out of Reel, put it back in place by setting the outer end of Spiral spring in place in Reel first, then by winding Spiral spring counterclockwise towards the center of Reel. (**Fig. 13**)
(2) Apply a little amount of Makita grease N No.2 to the whole surface of Spiral spring.
(3) Put Starter rope through Starter case complete.
  After passing the one end through Starter knob and Rope stopper, tie the end as drawn in **Fig. 14**. Then cover the top of Starter knob with Cap.
  After passing the other end from the hole of Starter case to Reel, tie the end in Reel.
(4) Wind Starter rope around Reel for the 2/3 length (When the whole length is 1m, wind 66cm.)
(5) While setting the inner end of Spiral spring into the center slot of Starter case, assemble Reel to Starter case properly.
(6) Tighten M6x20 Set screw with Phillips screwdriver No. 3. (**Fig. 11**)
(7) Make a slack of Starter rope then hook it on U-shaped notch of Reel. (**Fig. 11**) Turn Reel counterclockwise to spin Starter rope around Reel.

Important: Make sure that the proper spring force is effective to Starter assembly by turning Starter knob by hand and it can be returned back to the original position. (**Fig. 15**)
Even if Starter rope is pulled to the full, there is room to rotate Reel because of Spiral spring performance.

Fig. 13

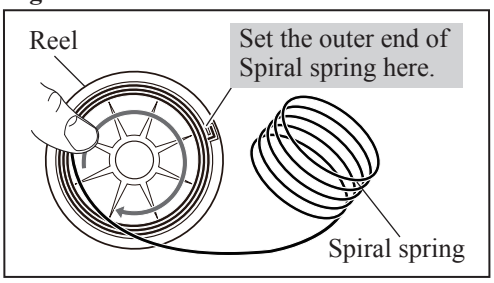


Fig. 14

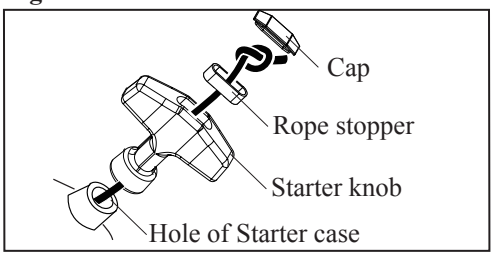
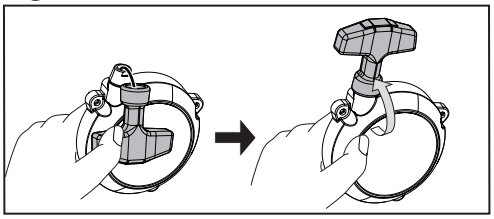


Fig. 15



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-3. Clutch, Ratchet

DISASSEMBLING

(1) Remove Cutting device. Refer to the clause of **[4]-1**.
(2) Loosen three M5x12 Hexalobular socket head bolts, then remove Clutch cover together with Starter assembly. (**Fig. 16**)
(3) Loosen three M5x16 Hexalobular socket head bolts with 1R290 and Cordless impact driver, and remove Ratchet complete. (**Fig. 17**)
(4) Remove M10-17 Hex lock nut by turning it **counterclockwise** by using Cordless impact driver with Socket bit.
(5) Turn the hexagonal portion of Clutch holder **clockwise** by using Cordless impact driver with Socket bit.
Clutch complete is removed.
Note: Clutch holder has a left hand thread.
(6) Remove Clutch drum assembly by hand. No tools are required.
Remove Retaining ring R-35 from Clutch drum with 1R005.
Press down Ball bearing 6003LLU in Clutch drum.

Fig. 16

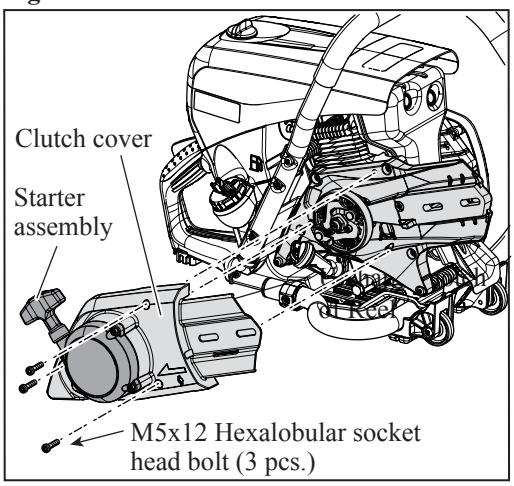


Fig. 17

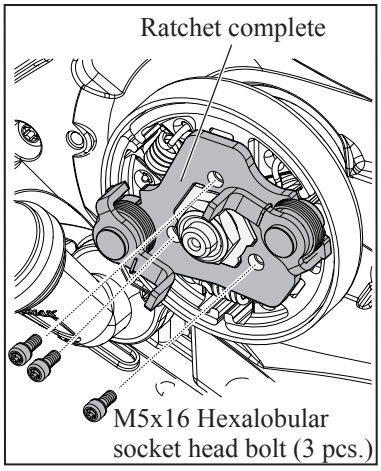


Fig. 18

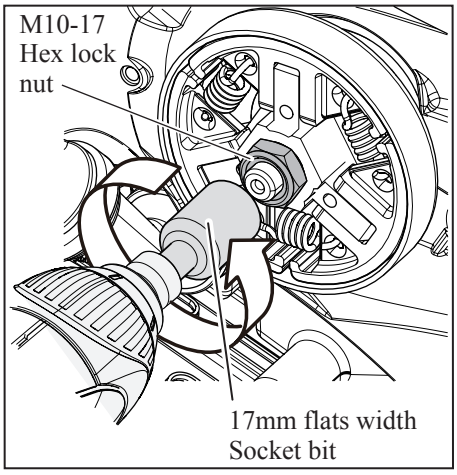
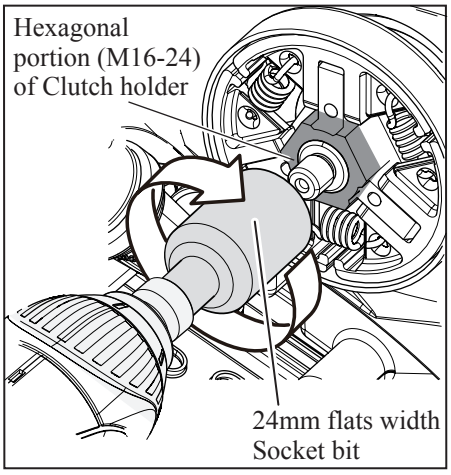


Fig. 19



ASSEMBLING

(1) Put Spacer 17 and Clutch drum assembly to Crankshaft, then put the other Spacer 17 on Clutch drum assembly. (**Fig. 20**)
(2) Remove Spark plug and assemble 1R372 carefully to Cylinder block by hand to prevents Crankshaft from being rotated. (**Fig. 21**)
(3) Turn Flywheel slowly and carefully by hand until the top of 1R372 contacts Piston.
Note: Do not damage Piston.
(4) Turn the hexagonal portion of Clutch holder **counterclockwise** with 1R223, 1R224 and 17mm flat width Socket in order to tighten Clutch complete to the fastening torque 38N.m. (**Fig. 20**)
Note: • Do not use Cordless impact driver.
• Do not turn the hexagonal portion with 1R372 taken apart from Piston.
(5) Assemble M10-17 Hex lock nut to Crankshaft by reversing the disassembling procedure shown in **Fig. 18**.
(6) Set Ratchet complete and three M5x16 Hexalobular socket head bolts in place by reversing the disassembling procedure shown in **Fig. 17**.
(7) Assemble the rest in accordance with the clause of **[4]-1**.

Fig. 20

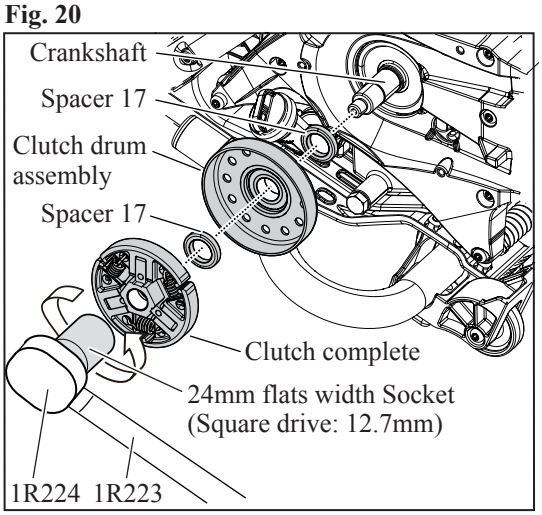
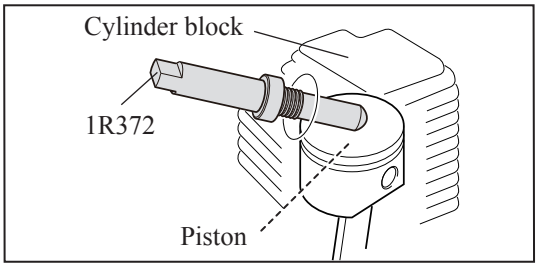


Fig. 21



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-4. Flywheel, Ignition coil

DISASSEMBLING FLYWHEEL COMPLETE

(1) Loosen four M5x30 - Hexalobular socket head bolts, then remove Fan cover. (**Fig. 22**)
(2) Remove M10 Flange nut from Crankshaft by turning counterclockwise by using Cordless impact driver with 14mm flats width Socket bit. (**Fig. 23**)
(3) Mount 1R364 on Flywheel complete, then put Screwdriver through the center shaft of IR364. (**Fig. 24**)
(4) While holding the one of M6 bolts and center bolt with Water pump pliers to prevent 1R364 from being rotated, turn Screwdriver clockwise. When Flywheel is removed from Crankshaft, a snap sound is heard because of their tapered fit.

Fig. 22

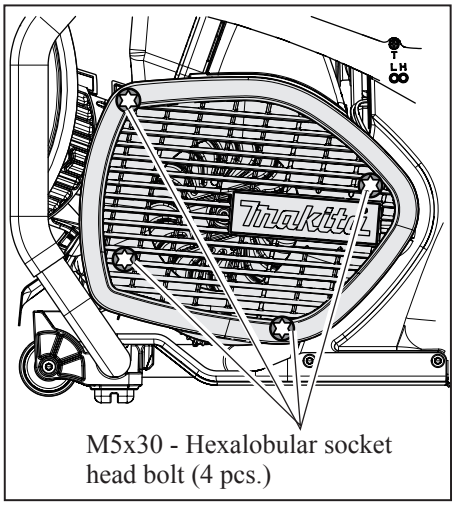


Fig. 23

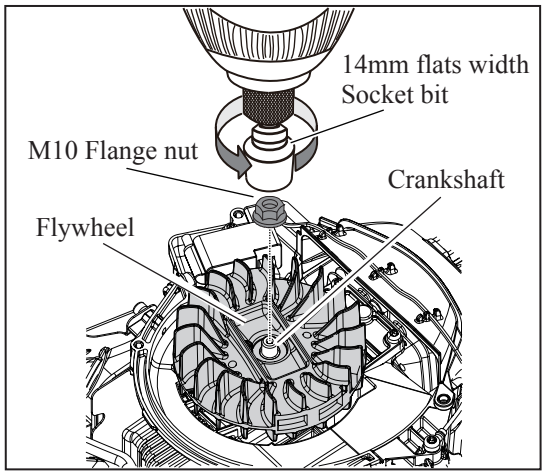
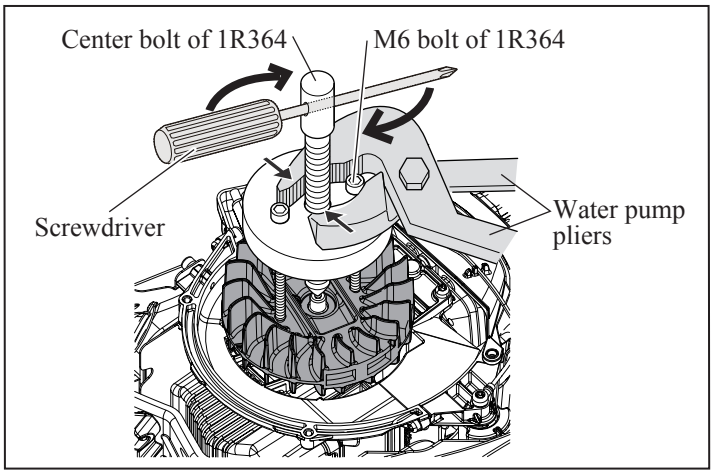


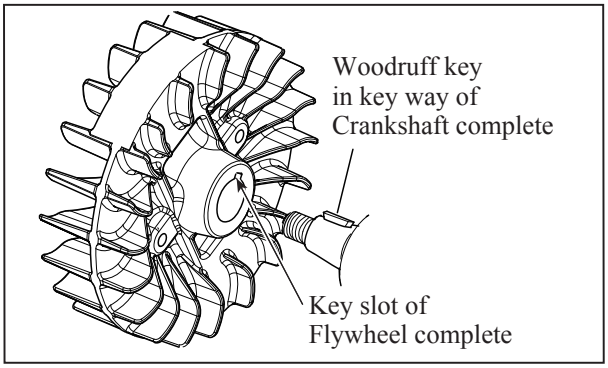
Fig. 24



ASSEMBLING FLYWHEEL COMPLETE

(1) Remove grease from Crankshaft complete.
(2) After aligning the key slot of Flywheel complete with Woodruff key in the keyway of Crankshaft complete, mount Flywheel complete onto Crankshaft complete. (**Fig. 25**)
(3) Assemble the rest by reversing the disassembly procedure.

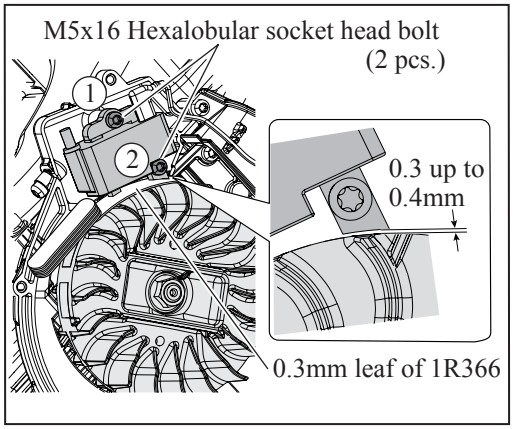
Fig. 25



ADJUSTMENT THE GAP BETWEEN IGNITION COIL AND FLYWHEEL

0.3 up to 0.4mm is the proper gap between Ignition coil and Flywheel. Refer to **Fig. 26** and the following steps.
(1) Loosen two M5x16 Hexalobular socket head bolts on Ignition coil.
(2) Insert 0.3mm leaf of 1R366 between Ignition coil and the magnet of Flywheel complete.
Ignition coil will be attracted to the magnet through the Feeler gauge. Then, without removing the Feeler gauge, fasten Ignition coil to the engine with two M5x16 Hexalobular socket head bolts. First tighten ①, the next, tighten ②. The order is easy to keep the proper gap.
(2) Remove 1R366. Then make sure that Flywheel complete does not touch Ignition coil by turning it by hand.

Fig. 26



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-4. Flywheel, Ignition coil (cont.)

DISASSEMBLING IGNITION COIL

(1) Loosen M6x15 Thumb screw, then remove Top cover. (**Fig. 27**)
(2) Loosen four M5x40 Hexalobular socket head bolts, then remove Filter cover complete (**Fig. 28**) and Air filter. (**Fig. 29**)
(3) Loosen M5x16 Hexalobular socket head bolt, then remove Cylinder cover. Remove Plug cord of Ignition coil assembly from Cylinder cover. (**Fig. 30**)
(4) Remove Flag terminal on Lead unit end from Ignition coil with care to the breaking of Lead unit.
Note: It is recommend to apply "the principle of leverage." Without being forced to pull, put the long noses of Pliers on the edge of Ignition coil and lever up the flag terminal. (**Fig. 31**)
(5) Loosen two M5x16 Hexalobular socket head bolts, and then remove Ignition coil. Refer to **Fig. 26**.
Important: Unless the disassembling is necessary for repair, do not touch the bolts of Ignition coil. In case of disassembling them, the hard work "ADJUSTMENT THE GAP BETWEEN IGNITION COIL AND FLYWHEEL" will be required.

Fig. 27

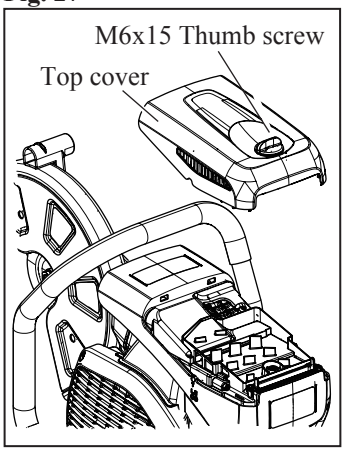


Fig. 28

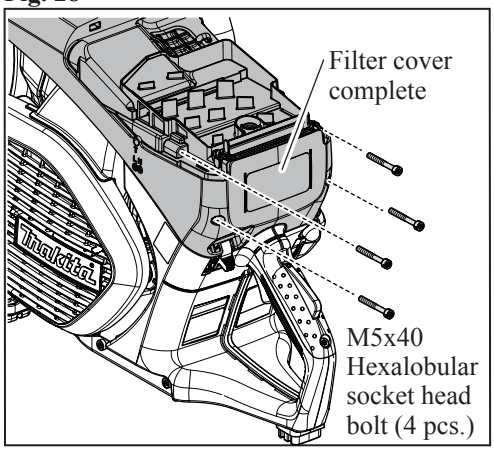


Fig. 29

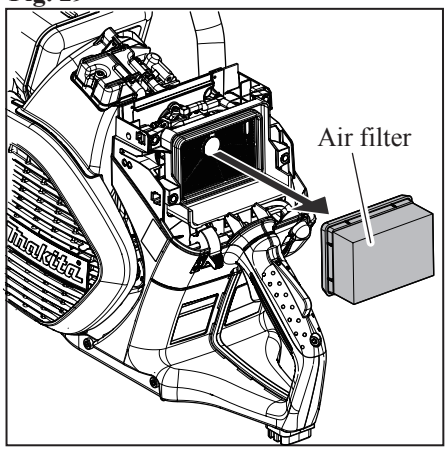


Fig. 30

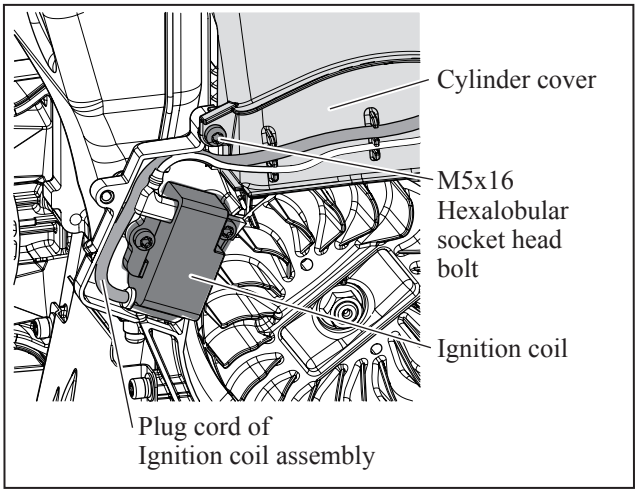
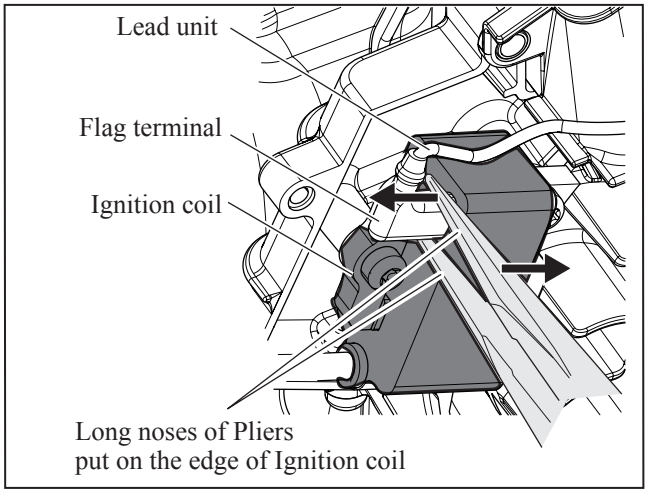


Fig. 31



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-5. Carburetor

(1) After completion of the steps (1) and (2) on **[4]-4**, remove Grip cover by loosening 5.5x20 Hexalobular tapping screw. (**Fig. 32**)

(2) Loosen two M5x45 Hexalobular socket head bolts, then remove Carburetor and Filter gasket from Carburetor mount. (**Figs. 33 and 34**)

Note: Use 1R311 to hold/ pinch Tubes to lever it up for easy removing. Do not use the sharp edged Pliers that causes damage to Tubes. (**Fig. 35**)

(3) Remove Contact spring. (**Fig. 36**)

(4) Carburetor WT can be disassembled as shown in **Fig. 37**.

Note: • Check the components' shrinkage, hardening or breakage due to aged deterioration. If any, replace it with a new one.

• Carburetor for some countries is different from Carburetor WT. (**Fig. 37**) The components cannot be supplied individually because of the regulation for compliance with standards.

(5) Before mounting the inner parts of Pump body assembly in place, make sure that the tip of Inlet needle valve is neither worn nor deformed.

Note: The inner parts are not available individually. If you need some of the inner parts, order Pump body assembly.

(6) Make sure that Inlet screen is not clogged, then set it back in place.

(7) Spray carburetor cleaner in all the fuel lines of Carburetor, then after several minutes, wash out dirt and debris with clean gasoline.

Fig. 32

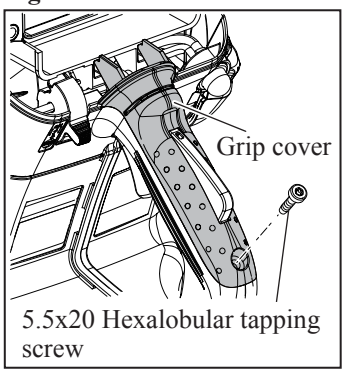


Fig. 33

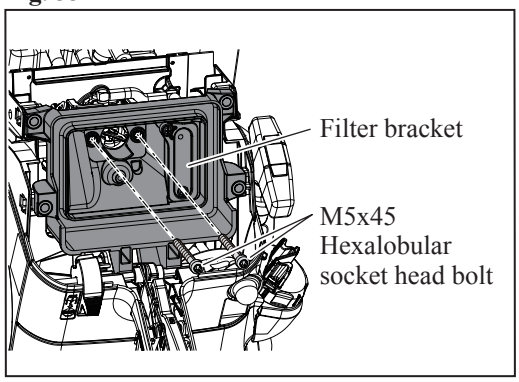


Fig. 34

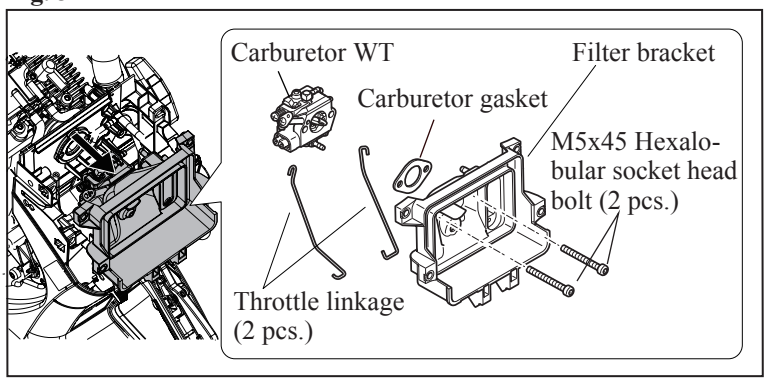


Fig. 35

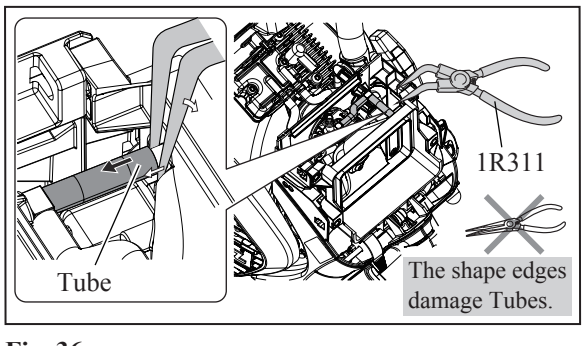


Fig. 36

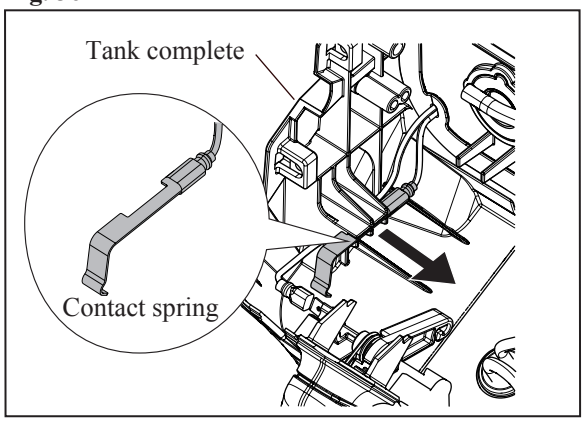
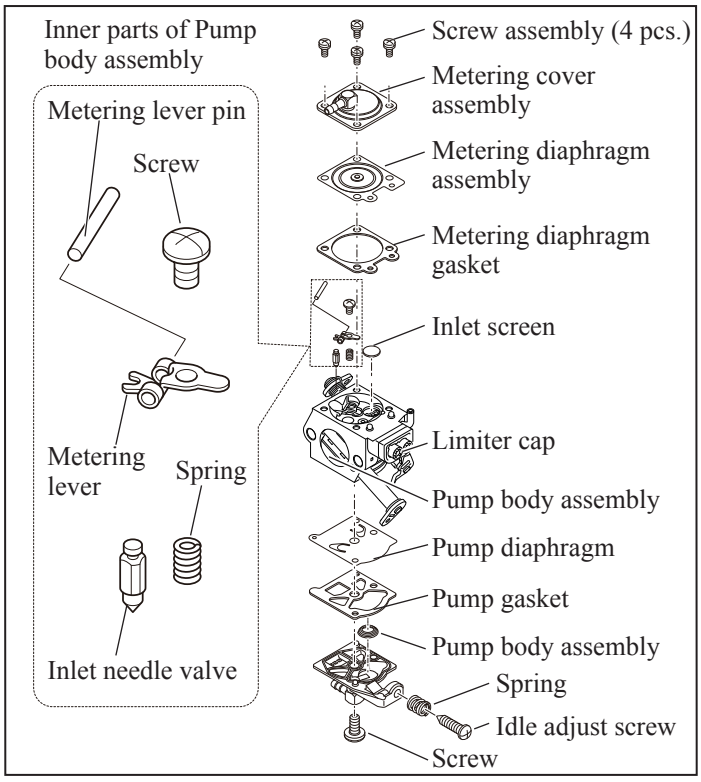


Fig. 37



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-5. Carburetor (cont.)

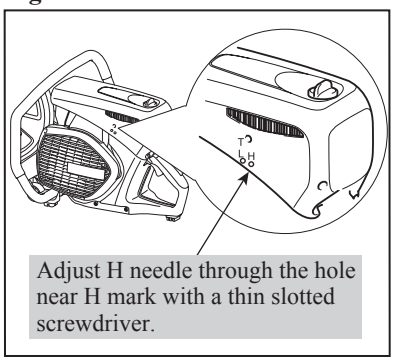
ADJUSTMENT OF CARBURETOR AFTER REPLACEMENT

Pull throttle lever fully after a while engine running at idle position. When there is a problem with the engine quick acceleration, adjust H needle (**Fig. 38**) as follows:

(1) Warm up the engine by pulling the throttle lever fully for one minute.
(2) Keep engine idling and do fine adjustment of the idling speed by turning H needle (**Fig. 38**) with a thin slotted screwdriver.
(3) Pull the throttle lever quickly. If Engine stall happens/ Engine does not reach the maximum rpm, do step (4). If there are no problems with the engine quick acceleration, go ahead to step (5).
(4) Unscrew H needle 1/8 turn (45°) with a thin slotted screwdriver. After pulling the throttle lever fully with no load, retry the step (3).
(5) Push two Limiter caps (**Fig. 37**) into Carburetor with a flat top of rod.

Note: It is not necessary to touch L needle.

Fig. 38



ASSEMBLING

Assemble by reversing the disassembly procedure. Be careful to the following points.

- Align the ends of Sponge sleeve 9 and Breather on Tube 3-190. (**Fig. 39**)
- Set Breather in place so that Tube 3-190 is fixed to the rib in Tank complete. (**Fig. 40**)
- Set Tubes, Choke linkage and Throttle linkage in place. (**Fig. 41**) Be careful to each direction of the linkages.

Fig. 39

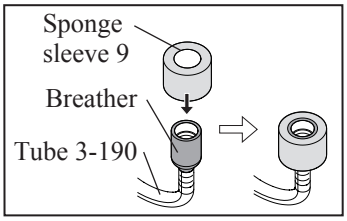


Fig. 40

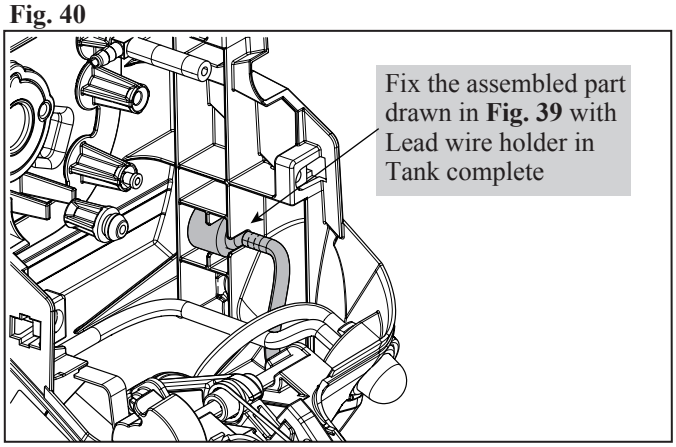
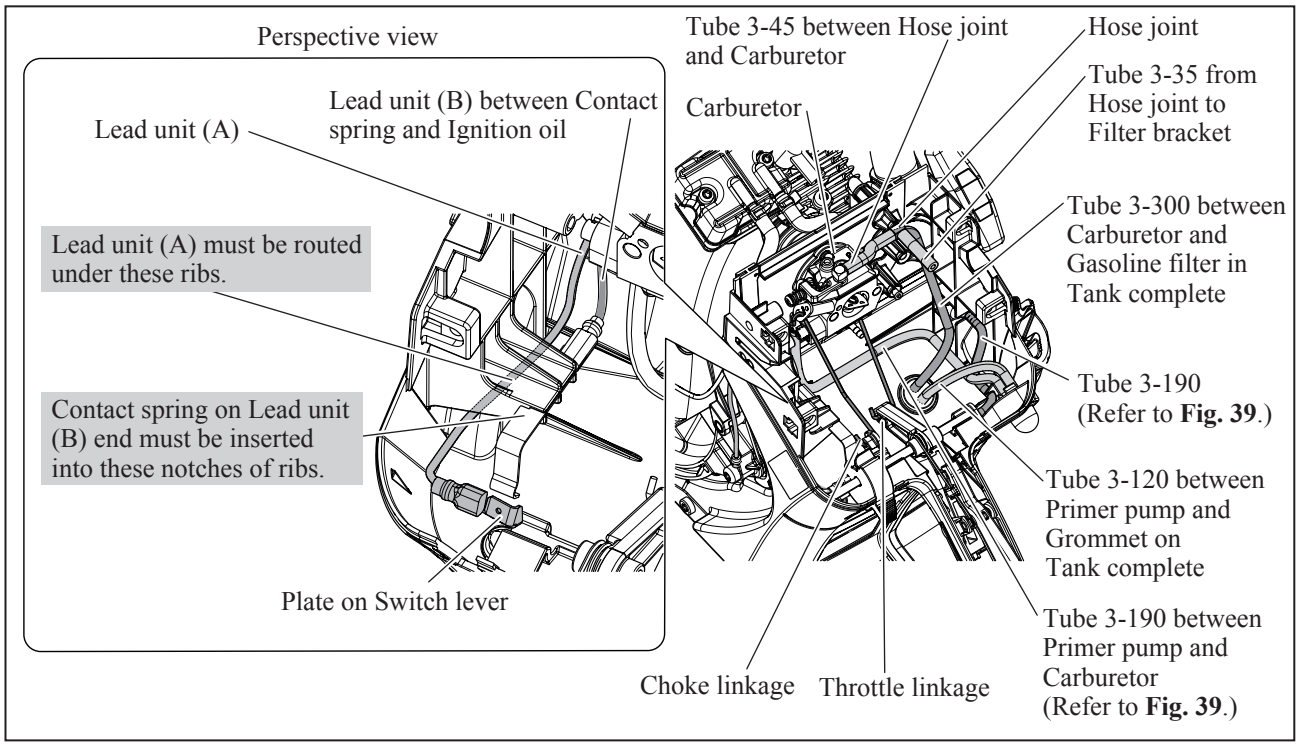


Fig. 41



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-6. Throttle lever

DISASSEMBLING

(1) Remove Pin 5 from the grooves on Tank complete by levering it up with a slotted screwdriver. (**Fig. 42**)
(2) Expand the hinge portion for Throttle lever on Tank complete with 1R003. (**Fig. 43**)
Throttle lever section can be removed as drawn in **Fig. 44**.

Fig. 42

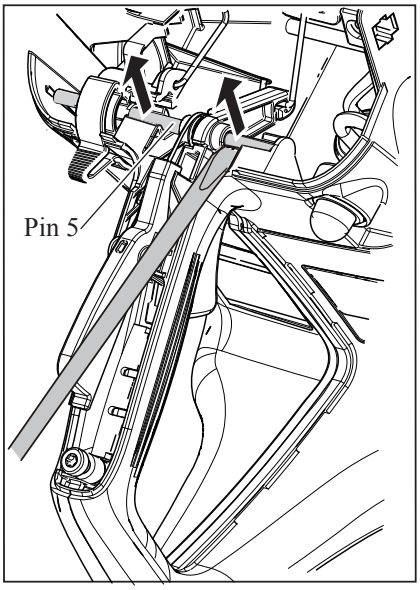


Fig. 43

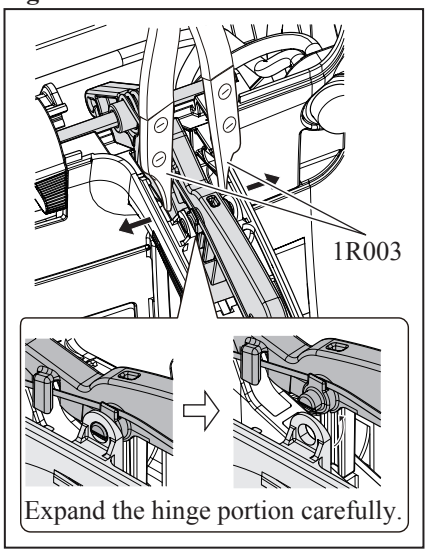
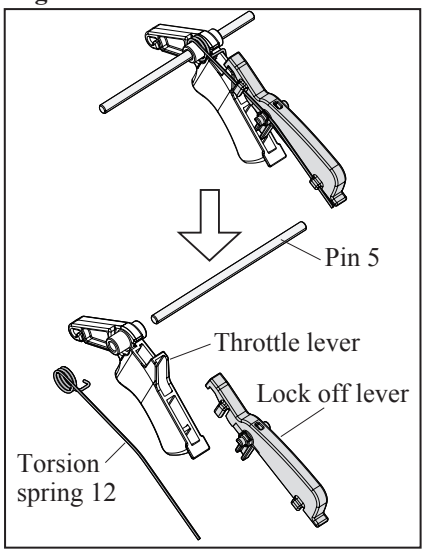


Fig. 44

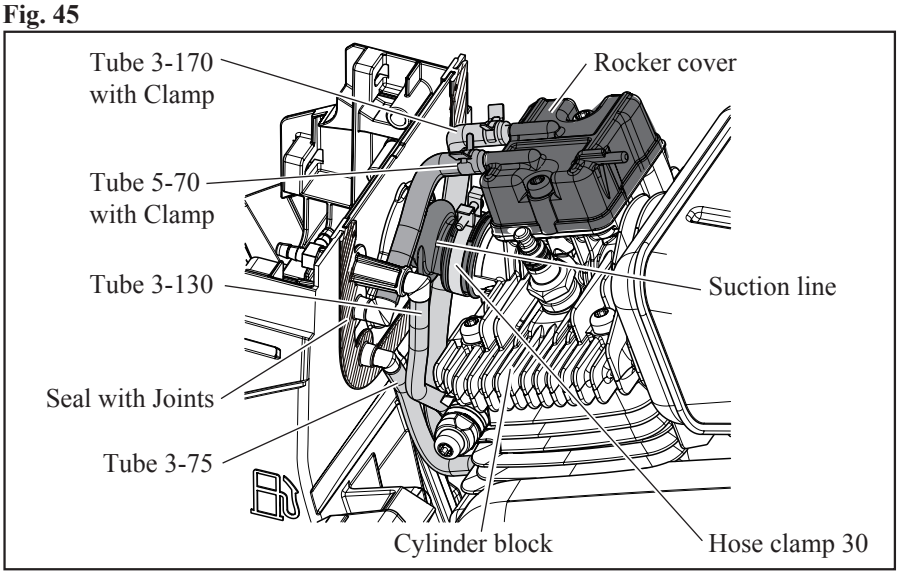


[4]-7. Engine block

DISASSEMBLING

Note: • It is highly recommended to drain the oil system of Engine block before starting disassembling because the oil remaining there will drip out to delay your operation.
• When Piston section is repaired, it is necessary to remove Engine from Tank complete.
(1) Remove Hood section. Refer to **Fig. 4 of [4]-1**.
(2) Remove Carburetor. Refer to **[4]-5**.
Refer to **Fig. 45** and do the following steps (3), (4), (5).
(3) Remove three Tubes' ends that come from Cylinder block complete as follows:
• Tube 3-170 with Clamp to Rocker cover
• Tube 3-130 to Hose joint in Seal
• Tube 3-75 to Hose joint in Seal
(4) Remove Tube 5-70 with Clamp from Rocker cover.
(5) Loosen Hose clamp 30 then remove Suction line from Cylinder block complete.

Fig. 45



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-7. Engine block (cont.)

DISASSEMBLING

(6) Remove four M6x30 Hexalobular socket head bolts that fasten Front handle, Tank complete and Engine. (**Fig. 46**) Engine block can be removed. (**Fig. 47**)

Fig. 46

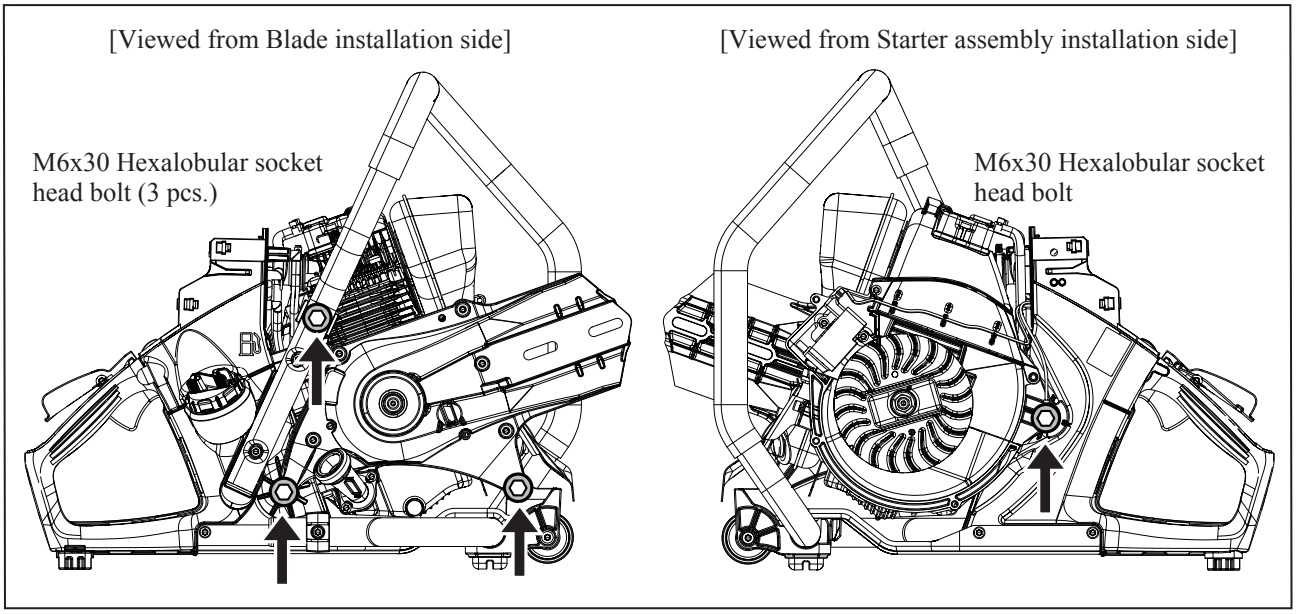
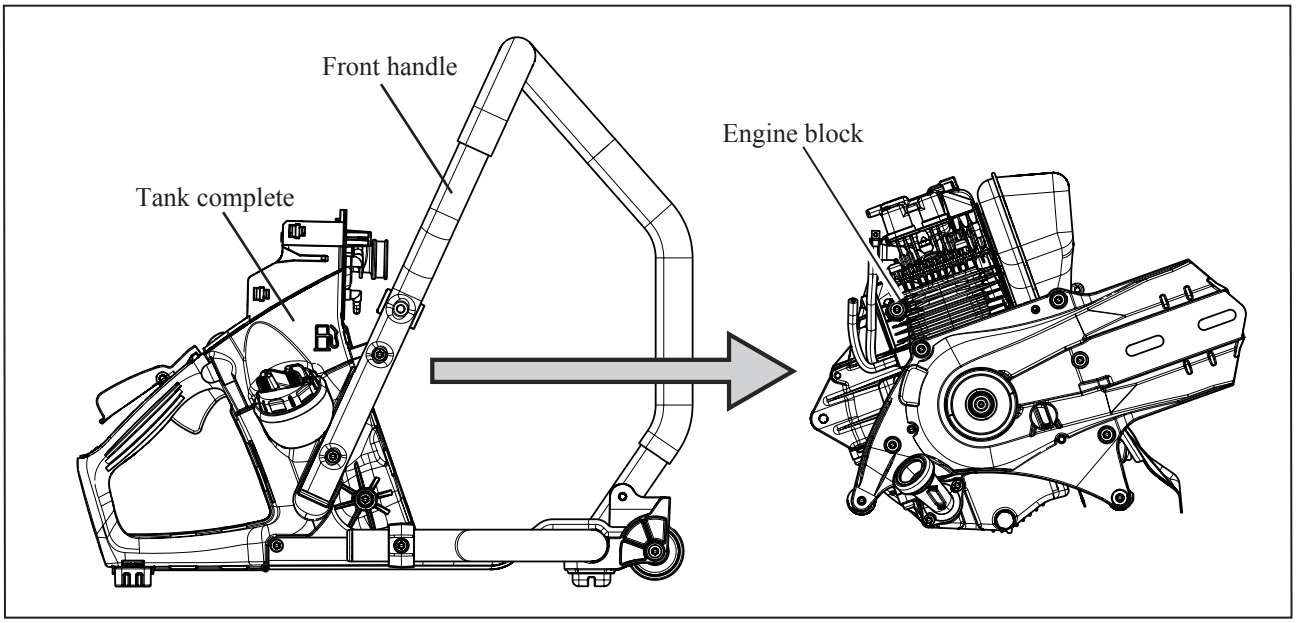


Fig. 47



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-8. Engine

DISASSEMBLING

(1) Remove Clutch complete and Clutch drum. Refer to **[4]-3**.
(2) Remove Flywheel. Refer to **[4]-4**. If necessary, remove Ignition coil.
(3) Loosen five M6x25 Hexalobular socket head bolts, then remove Cutting arm from Cylinder block complete. (**Fig. 48**)
(4) Remove Exhaust muffler from Cylinder block complete.
Note: Although Spark arrester can be removed from Exhaust muffler, it is not permitted to replace Spark arrester only because it functions as the integrated part with Exhaust muffler.
(5) Remove Oil case from Cylinder block complete. (**Fig. 49**)

Fig. 48

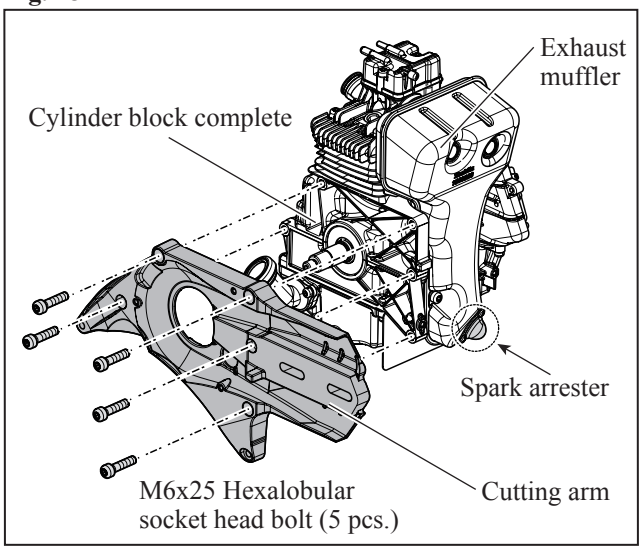
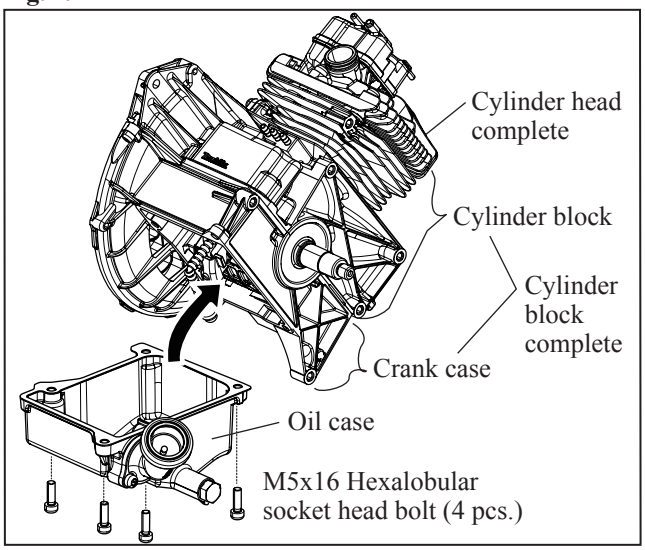


Fig. 49



Note: Unless you repair Exhaust valves, Cam lifters, and Rocker arms, do the following steps. It is not necessary to remove Cylinder block from Crank case (**Fig. 49**)/ Carburetor from Cylinder block complete (Refer to **Fig. 34**.)
(6) Remove two M6x20 Hexalobular socket head bolts on the upper side of Exhaust muffler.
Remove two M5x25 Hexalobular socket head bolts then separate Rocker cover complete from Cylinder head complete. (**Fig. 50**)
(7) Loosen Hose clamp then remove Suction line from Cylinder head complete. (Refer to **Fig. 41**)
(8) Remove Cylinder head complete from Cylinder block, then pull out two Push rods. (**Fig. 51**)
Note: Do not failure to mix them up. It is recommend to distinguish Exhaust push-rod and Intake push-rod.
(9) Remove Cam gear cover (**Fig. 52**).
(10) Remove Cam lifter L and Cam lifter R. Then, remove Cam gear complete by pulling out Pin 5. (**Fig. 53**)

Fig. 50

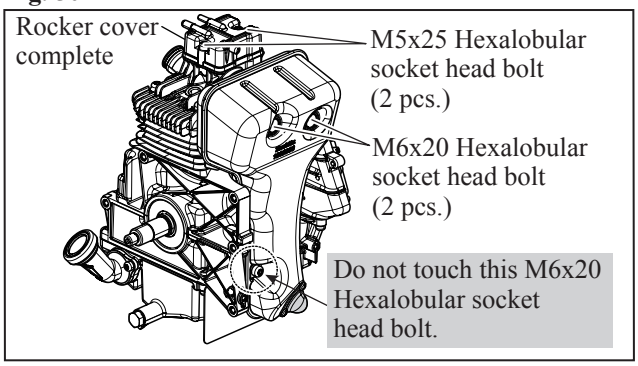


Fig. 51

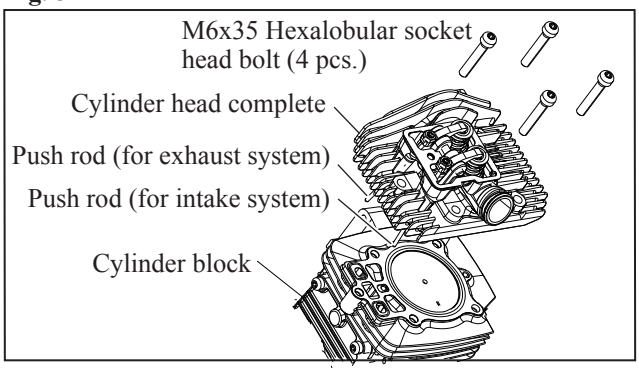


Fig. 52

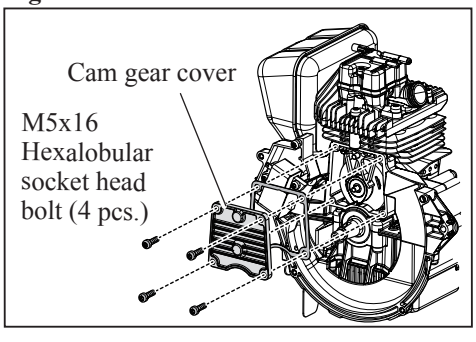
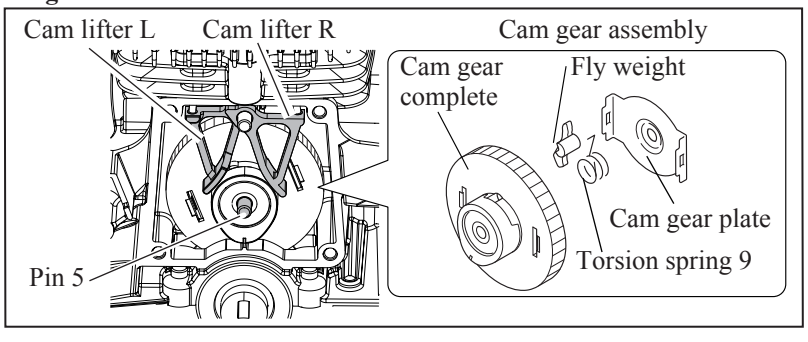


Fig. 53



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-8. Engine (cont.)

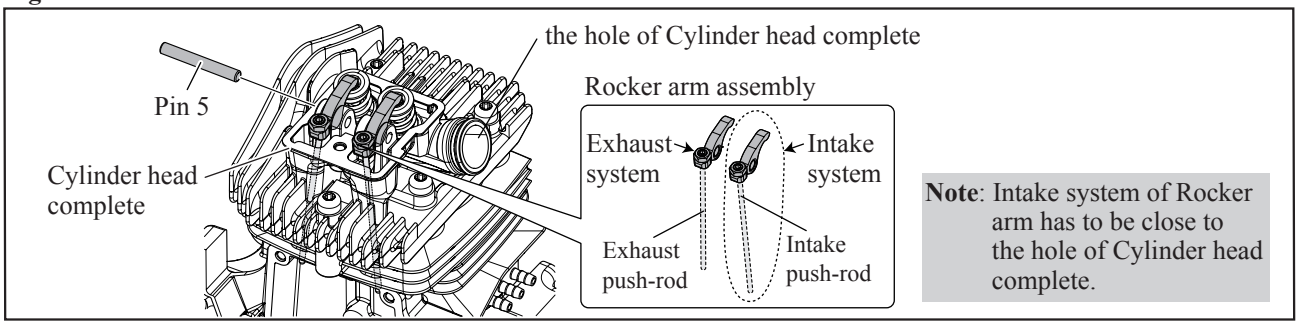
DISASSEMBLING

Note: Cam gear assembly functions as automatic decompression valve system.
Valve is slightly open to release the compressed air in Engine at the starting time, before moving fly weight by centrifugal effects. It means the insufficient setting of Cam gear assembly will cause engine stall/ extreme reaction force at engine running due to too much load by the compressed air.

(11) Remove Pin 5 that sets Rocker arm assembly in place on Cylinder head complete. (**Fig. 54**)
Use 1R308 to push out Pin 5.

The distinction of Rocker arm assembly and Push rods (for use of the exhaust system/ intake system) enables you shortens the repair process (Gap adjustment between Rocker arms and Retainers is even difficult, however, you can adjust it by using 1R366. Refer to **Fig. 68**.

Fig. 54



Important: Disassemble the parts in the room on Cylinder head complete before removing it and clean the clogged portions in the following steps. You may repair successfully without doing the step (5) and later in the next page.

(1) Remove Rocker cover complete, then push out Pin 5 on hinge for Rocker arms with 1R308 and remove Rocker arms. (Refer to **Figs. 50** and **54**)

(2) Remove Spark plug. Turn Flywheel until Piston comes to the upper dead point by looking through Spark plug hole on Cylinder head complete.
Note: Align the rib as a mark on Flywheel with the rib on Cylinder block as drawn in **Fig. 55**.

(3) Insert a bent Lead wire #16 into Combustion chamber through Spark plug hole so that Valves do not fall into Combustion chamber. (**Fig. 56**)

(4) While compressing Compression spring 11 by pushing Retainer with 1R003 attached with 1R389, remove Cotter by a thin bit magnetized by 1R288.
Routes in Cylinder head complete, the upper surface on Valves and the room on Cylinder head complete can be clean through removal of four Cotters, two Retainers, and two Compression springs 11.

Fig. 55

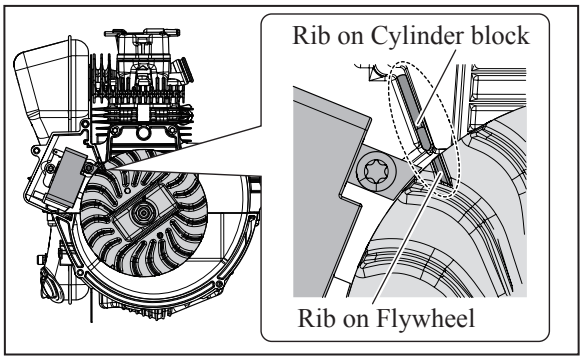


Fig. 56

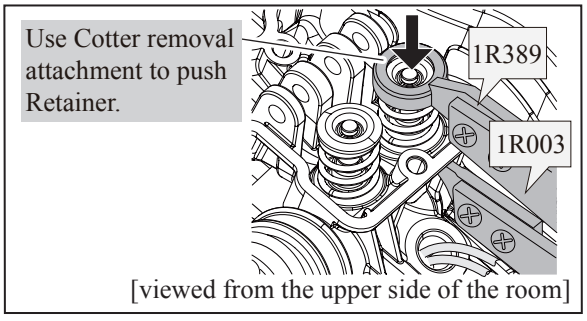
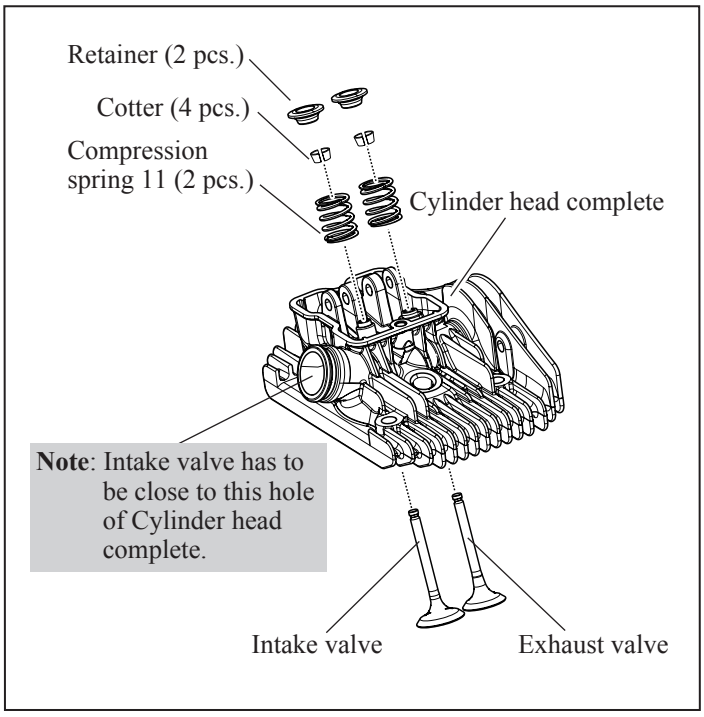


Fig. 57



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-8. Engine (cont.)

DISASSEMBLING

Important: When Intake/ Exhaust valves have to be replaced, remove Cylinder head complete.
(Refer to previous page.)

(5) Loosen eleven Hexalobular socket head bolts on the bottom of Crank case (**Fig. 58**), then remove Crank case from Cylinder block. As Liquid gasket makes Cylinder block stick on Crank case, insert and twist a slotted screwdriver between the clearance. (**Fig. 59**)
Scrape away Liquid gasket on the mating surface.

(6) Pull out the assembled part of Crank shaft and Piston from Cylinder block. (**Fig. 60**)

(7) Remove one of Ring spring 12 with a thin slotted screwdriver, then push Piston pin from the opposite with care so as not to damage the other Ring spring 12. (**Fig. 61**)

The following parts mentioned in **Fig. 62** can be replaced individually. When the rest parts have to be replaced, Crankshaft complete is required.

Fig. 58

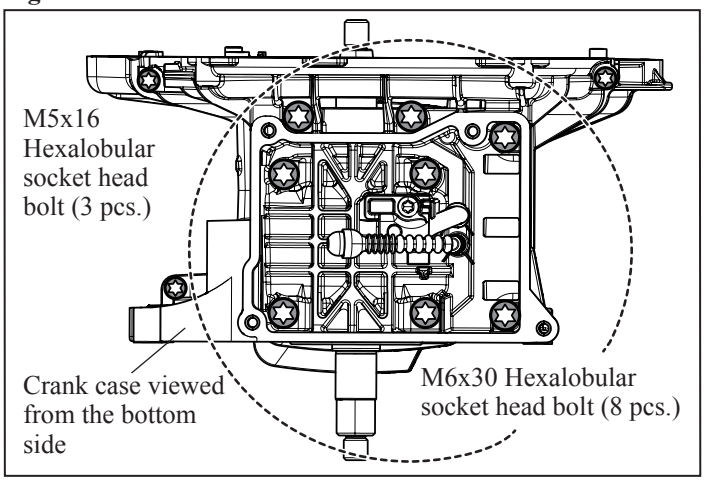


Fig. 59

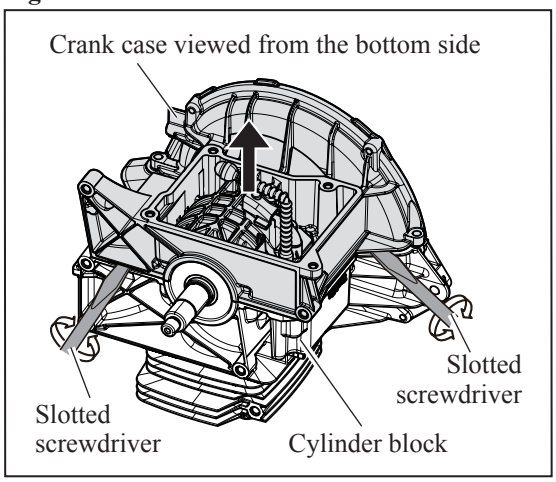


Fig. 60

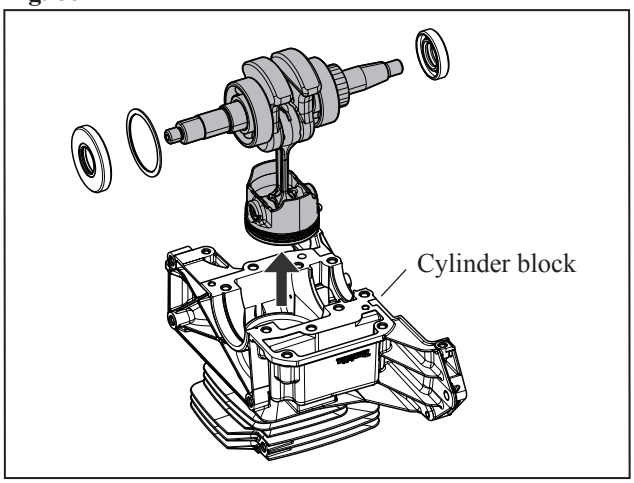


Fig. 61

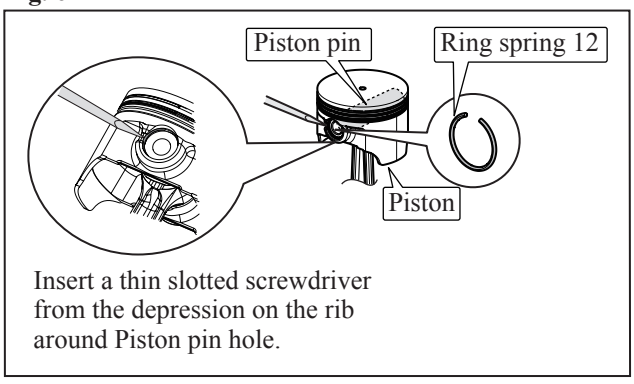
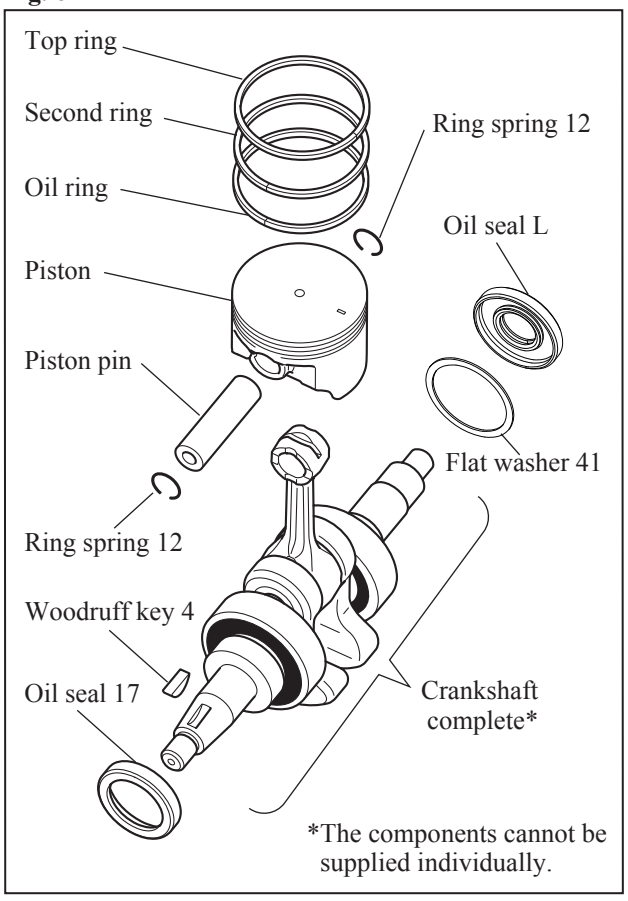


Fig. 62



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-8. Engine (cont.)

ASSEMBLING ENGINE BLOCK

Note: Be sure to apply Makita grease N No.2/ 4-cycle engine oil in accordance with **[3] LUBRICANT APPLICATION**.

(1) Connect Piston with Crankshaft complete by inserting Piston pin into place; there is no front/back to Piston.

(2) Secure Piston pin by mounting Ring spring 12 onto each end of Piston pin.
Note: The ring gap of Ring spring 12 can be positioned at any angle to Piston pin.

(3) Install Oil ring in the grooves of Piston; Side rail first, Spacer next, then the other Side rail.
Important: Be sure to fit the three rings with the ring gaps at 120 degrees to one another as shown in the left of **Fig. 63**.

(4) Install Second ring first then Top ring in the groove of Piston.
Important 1: Be sure to fit the two rings with the ring gaps at 180 degrees to each other as shown in the right of **Fig. 63**.
Important 2: Second ring has a taper face and must be installed with the large diameter facing Oil ring. (**Fig. 64**)
Distinguishing between Top ring and Second ring & Discriminating the larger diameter of Second ring:
If both of the two rings are new and unused,
- You can distinguish from their appearances; there is a red marking on the side face of Second ring as shown in **Fig. 65** while not on the side face of Top ring.
- You can face the large diameter of Second ring by placing Second ring with the red marking on your right and with the ring gap near you as shown in **Fig. 65**.

If both of the two rings are used and the white marking of Second ring is rubbed off, carefully press the side face of the two rings to the inner wall surface of Cylinder. You will be able to distinguish the two rings or to discriminate the large diameter of Second ring through the differences in contact feelings that the different side faces make.

(4) Remove oil/grease from the mating surface of Cylinder block and Crankcase.
Then apply ThreeBond 1215 to the mating surface of Crankcase as shown in **Fig. 66**.

Note: ThreeBond 1215 must not be applied to Oil supply routes.
Apply 4-cycle engine oil to the cylinder portion of Cylinder block, and then while compressing Piston rings, mount Cylinder block onto Crankcase.

(6) Tighten eleven Hexalobular socket head bolts in a crisscross pattern. (Refer to **Fig. 58**.)

(7) Do not forget to set Exhaust port spacer in place on Muffler installation side of Cylinder head complete. (**Fig. 67**)

Fig. 63

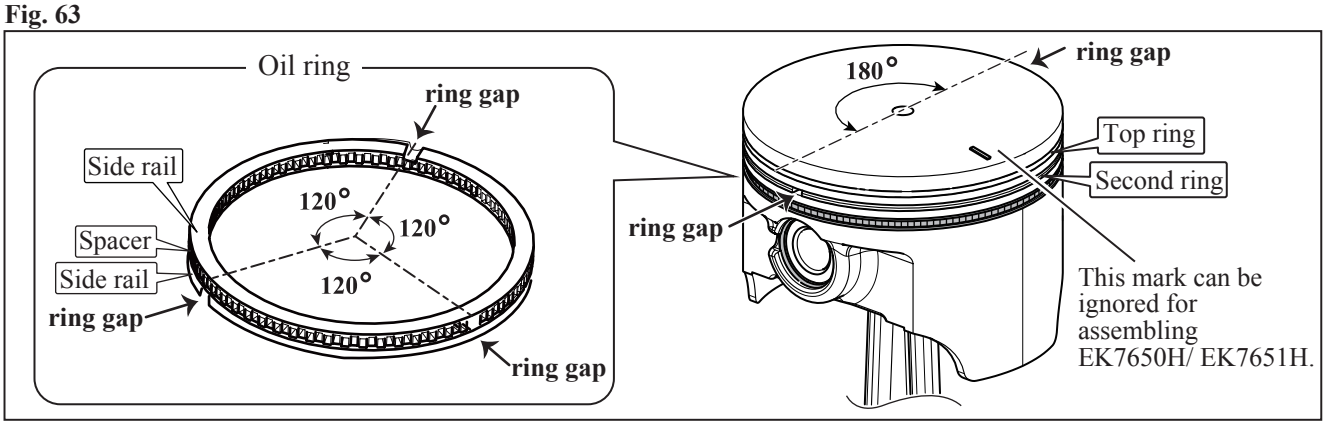


Fig. 64

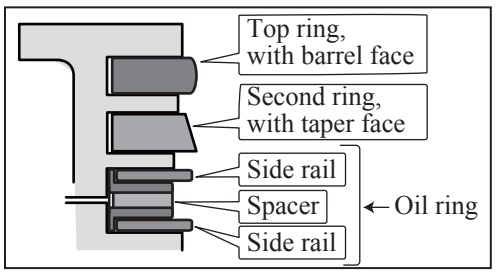


Fig. 65

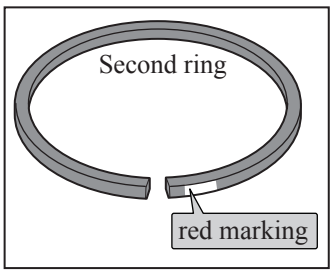


Fig. 66 [Crankcase viewed from top]

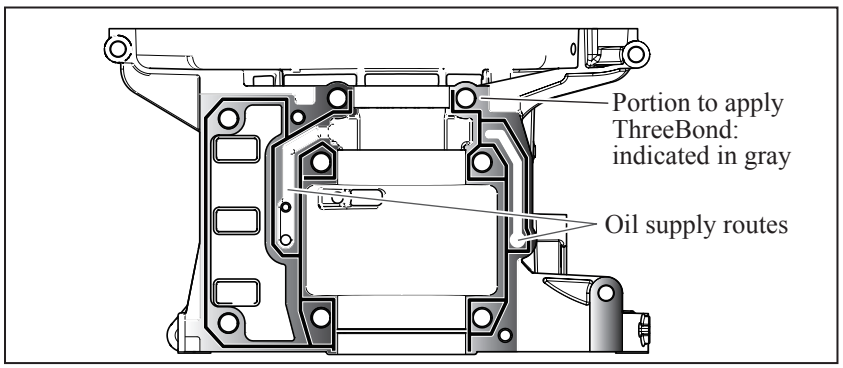
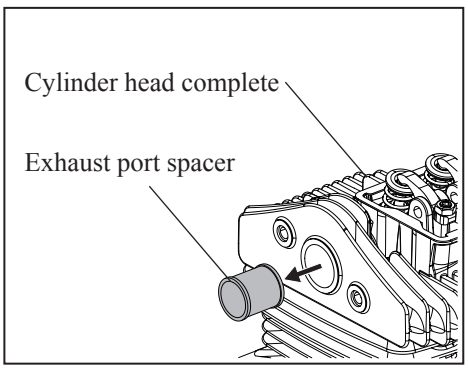


Fig. 67



Repair

[4] DISASSEMBLY/ASSEMBLY

[4]-8. Engine (cont.)

DISASSEMBLING

(8) Assemble Cam gear section by reversing the disassembly procedure. (Refer to **Fig. 53 and 52**.)
(9) Move Piston to the upper dead point in Cylinder block by turning Crankshaft slowly and carefully by hand.
(10) Adjust the gap between Rocker arms and Exhaust valve section/ Intake valve section as follows:
A. Put 0.1mm or 0.15mm leaf of 1R366 on Valve section. (**Fig. 68**)
B. While holding M5x9 Hex nut by Wrench 8, turn M5 Hex socket head bolt with Hex wrench 2.5. (**Fig. 68**)
C. Check the gap.
(11) After pretightening the nuts and bolts, turn Crankshaft complete by hand to move Crank portion two or three turns, check the gap again, if the proper gap is obtained, tighten the nuts and bolts firmly.
(12) Lead unit that comes from Stop switch has to be fastened to Cylinder block with 6x30 Hexalobular socket head bolt. (**Fig. 69**)
(13) Plug cord and Tube have to be fixed with Lead wire holders on Cylinder cover. (**Fig. 70**) And then, Plug cord has to be fixed with Lead wire holders on Cylinder cover to route it without slacking toward Flywheel. (**Fig. 71**)
Lead unit connected with Ignition coil has to be fixed with the Lead wire holders as drawn in **Fig. 71**.

Fig. 68

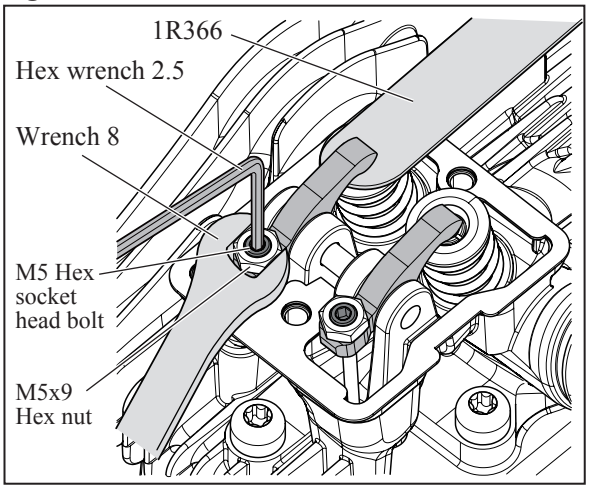


Fig. 69

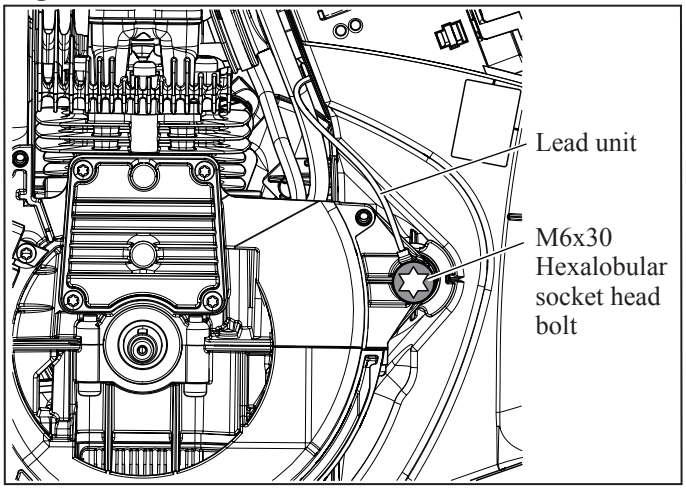


Fig. 70

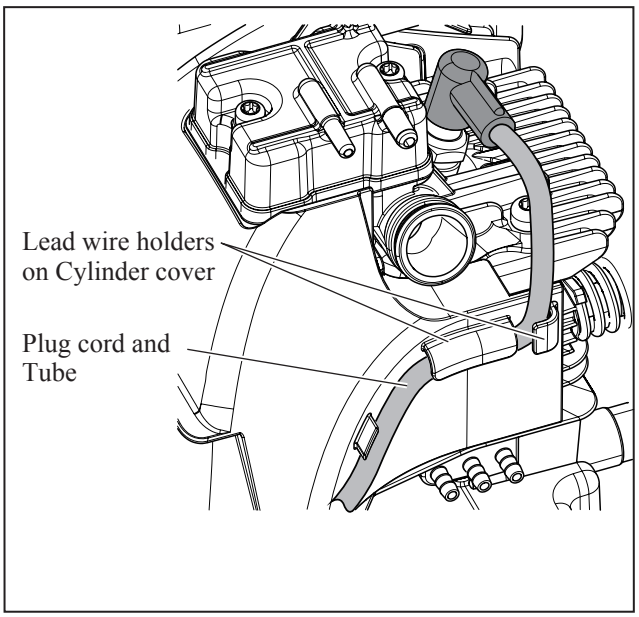
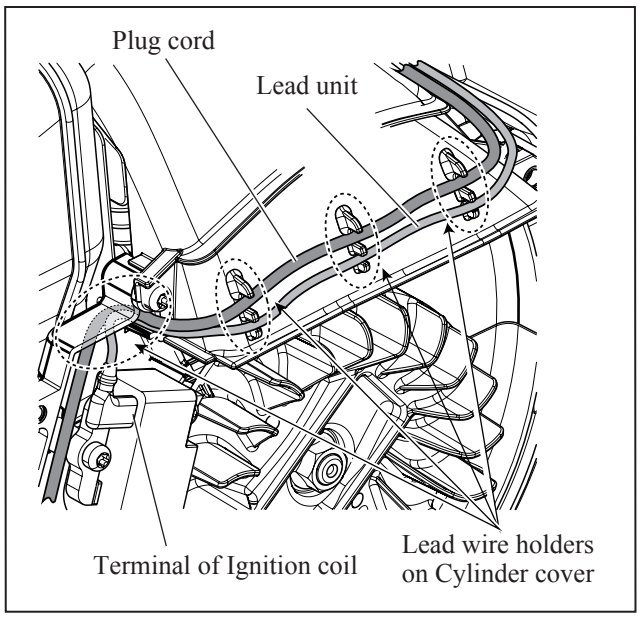


Fig. 71



Repair

[4] DISASSEMBLY/ASSEMBLY

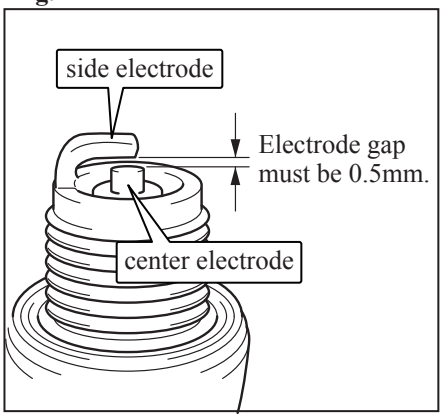
[4]-9. Ignition system (cont.)

CHECKING SPARK PLUG

WARNING !!
- **When a spark is produced, high-voltage current is delivered from Ignition coil to Spark plug. It is, therefore, very dangerous to pull Recoil starter knob with your hand on Ignition cable. Be sure to keep your hands off from Ignition cable when checking for spark.**
- **Fuel is extremely flammable and fuel vapors are explosive. Therefore, clean up spilled fuel before starting to check for spark. Also, be careful not to do the check near Carburetor.**

(1) Remove Plug cap from Spark plug, then Spark plug from Cylinder head complete with the supplied socket wrench.
Note: If the electrodes of Spark plug are wet, wipe them with a rag then dry them with an air blower.
(2) Using a wire brush, carefully clean up carbon deposits (if any) from the electrodes and the ceramic insulator around the center electrode.
(3) Adjust the electrode gap to 0.5mm by carefully bending the side electrode. Use Feeler gauge set (1R366) to check the gap width: between the center electrode and the side electrode, insert 0.5mm leaf of Feeler gauge set. (**Fig. 42**)
(4) Install another Spark plug into spark plug hole to prevent air/fuel mixture from leaking outside of engine.
(5) Connect the removed Spark plug with Plug cap, then ground the threads of Spark plug to a proper metal part of the engine.
(6) With Stop switch on, pull Recoil starter knob gently and check for spark.
Note: It is hard to see the spark in a bright location.
Therefore, be sure to do the check in a shady but well-ventilated place.
(7) If spark is not produced, replace Spark plug with a new one, then check for spark by following the procedure (1) to (6) once again.

Fig. 42



[5] Tightening torque specifications

	Application (for fastening A to B)		Fastener	Tightening torque (N.m)
	A	B		
1	Cushion	Tank complete	M6x30 Hexalobular socket head bolt	7
2	Cutting arm	Cylinder block complete	M6x25 Hexalobular socket head bolt	
3	Cutting arm	Belt cover	M8 Hex nut	30
4	Front inner holder		M6x30 Hexalobular socket head bolt	3
5	Crank case	Cylinder block	M6x30 Hexalobular socket head bolt	12
6	Cylinder head complete	Cylinder block	M6x35 Hexalobular socket head bolt	12
7	Flywheel	Crankshaft	M10 Flange nut	40
8	Clutch holder	Crankshaft	Hexagonal portion (M16-24) of Clutch holder	38
9	Clutch assembly	Crankshaft	M10-17 Hex lock nut	18
10	Rocker arm	M5 Hex socket head bolt	M5x9 Hex nut	6